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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/031,422	01/16/2002	James J Rathburn	52191-243421	6794
25764	7590	04/09/2004	EXAMINER	
FAEGRE & BENSON LLP 2200 WELLS FARGO CENTER 90 SOUTH 7TH STREET MINNEAPOLIS, MN 55402			TSUKERMAN, LARISA Z	
			ART UNIT	PAPER NUMBER
			2833	

DATE MAILED: 04/09/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/031,422

Applicant(s)

RATHBURN, JAMES J

Examiner

Larisa Z Tsukerman

Art Unit

2833

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 January 2004.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 91-139 is/are pending in the application.
- 4a) Of the above claim(s) 123, 130-132 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 91-111 and 134-136 is/are allowed.
- 6) ☒ Claim(s) 112-122, 124-129, 133, 137 and 138 is/are rejected.
- 7) ☒ Claim(s) 115-117, 125 and 139 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
- a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Newly submitted claims 123 (original 59), 130-132 (original 78) directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: these claims are **not a part of** elected specie **17/ Fig.16**; independent claim 112 (original 65 and 68) does not include any second housing.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 123 and 130-132 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

Claims 112, 113, 118-122, 124, 126 - 129, 133 and 137- 138 are rejected under 35 U.S.C. 103(a) as being unpatentable over Grange et al. (5388998) in view of Lightbody et al. (4528500).

In regard to claim 112, Grange et al. discloses an electrical connector 10 for electrically interconnecting terminals on a flexible circuit member 14/14' (see Col.4, line 68) with terminals on a second circuit member 12 (see Fig. 2), the electrical connector comprising:

a housing 50 having a plurality of through holes 62 extending between a first surface 56 and a second surface 54, each of the through holes defining a central axis;

Art Unit: 2833

a plurality of elongated electrical contact members 20a-c positioned in at least some of the through holes 62 and oriented along the central axes, the electrical contact members having **first ends 32** extending above the first surface 56 that **are attached to, and electrically coupled with, the terminals on the flexible circuit member 14/14'** (see Col.5, lines 49-54 and 55-59), the flexible circuit member 14/14' controlling movement of the electrical contact members along their respective central axes, and second ends 28 extending above the second surface 54 to couple electrically with the second circuit member 12. However, Grange et al. do not disclose **a compliant encapsulating member** elastically bonding the electrical contact members to the housing. Lightbody et al. discloses a compliant encapsulating member 32 to retain the electrical contact members 12 into the housing 11 and to insure a uniform an insertion depth of the pins 12 (see Col. 5, lines 30-33). **Therefore, it** would have been obvious to one having ordinary skill in the art at the time the invention was made to include a compliant encapsulating member 32 of Lightbody et al. in structure of Grange et al. to retain the contact member in the housing and to insure a uniform an insertion depth of the pins **in order to provide more even and more reliable electrical connection.**

In regard to claim 113, Grange et al. when modified by Lightbody et al. disclose that a portion of the compliant encapsulating material 32 is located between the electrical contact members 20 and the holes 62 in the housing 50.

In regard to claim 118, Grange et al. when modified by Lightbody et al. disclose the second surface 54 of the housing includes at least one **device site** corresponding to the second circuit member 12, as claimed

In regard to claim 119, Grange et al. when modified by Lightbody et al. disclose the second ends 28 of the electrical contact members 20a-c have a shape that corresponds to a shape of the terminals on the second circuit member 12 (see Fig.2 and Col. 5, lines 46-49).

In regard to claim 120, Grange et al. when modified by Lightbody et al. disclose the second ends 28 of the electrical contact members 20a-c are capable of engaging with a connector member 12 selected from the group consisting of a **flexible circuit, a printed circuit board** (see Col. 4, lines 59-64), (a ribbon connector, a cable, a ball grid array (BGA), a land grid array (LGA), a plastic leaded chip carrier (PLCC), a pin grid array (PGA), a small outline integrated circuit (SOIC), a dual in-line package (DIP), a quad flat package (QFP), a leadless chip carrier (LCC), a chip scale package (CSP), or packaged or unpackaged integrated circuits).

In regard to claim 121, Grange et al. when modified by Lightbody et al. disclose the electrical contact members 20a-c are one of a homogeneous material or a multi-layered construction (see Col. 5, lines 24-27).

In regard to claim 122, Grange et al. when modified by Lightbody et al. disclose the electrical contact members 20a-c have a cross-sectional shape selected from one of **circular**, oval, polygonal, and rectangular (see Col. 5, line 26).

In regard to claim 124, Grange et al. when modified by Lightbody et al. disclose the electrical contact members 20a-c are electrically coupled to the flex circuit using one or more of **solder** (see Col.5, lines 55-57), (a compressive force a wedge bond, a conductive adhesive, an ultrasonic bond and a wire bond).

In regard to claim 126, Grange et al. when modified by Lightbody et al. disclose electrical contact members 20a-c have a larger cross section proximate the first end 28 than at the second end 32 (see area around numeral 23 in Fig 2).

In regard to claim 127, Grange et al. when modified by Lightbody et al. disclose the plurality of through holes 62 are arranged in a two-dimensional array (see).

In regard to claim 128, Grange et al. when modified by Lightbody et al. disclose the resilient member 32 comprises a compliant encapsulating member elastically bonding the electrical contact 20a-c members to the housing 50.

In regard to claim 129, Grange et al. discloses the second ends 28 of the electrical contact members comprise one or more of (die level test probes, wafer probes, and) **printed circuit board probes** (see Fig.2, 3).

Art Unit: 2833

In regard to claim 133, Grange et al. discloses an electrical connector 10 comprising:

a flexible circuit member 14/14' having a plurality of terminals (see Col.4, line 68);

a first housing 50 having a plurality of **through holes 62** extending between a first surface 56 and a second surface 54, each of the through holes defining a central axis;

a plurality of elongated **electrical contact members 20a-c** positioned in at least some of the through holes 62 and oriented along the central axes, the electrical contact members having **first ends 32** extending above the first surface 56 that **are attached to, and electrically coupled with, the terminals on the flexible circuit member 14/14'** (see Col.5, lines 49-54 and 55-59), the flexible circuit member 14/14' controlling movement of the electrical contact members along their respective central axes, and second ends 28 extending above the second surface 54 to couple electrically with the second circuit member 12. However, Grange et al. do not disclose **a compliant encapsulating member** elastically bonding the electrical contact members to the housing.

Lightbody et al. discloses a compliant encapsulating member 32 to retain the electrical contact members 12 into the housing 11 and to insure a uniform an insertion depth of the pins 12 (see Col. 5, lines 30-33). **Therefore, it** would have been obvious to one having ordinary skill in the art at the time the invention was made to include a compliant encapsulating member 32 of Lightbody et al. in structure of Grange et al. to retain the contact member in the housing and to

Art Unit: 2833

insure a uniform an insertion depth of the pins **in order to provide more even and more reliable electrical connection.**

In regard to claim 137, Grange et al. disclose a method of making an electrical interconnect for electrically coupling terminals (not shown) on a flexible circuit member 14/14' with terminals (not shown) on a second circuit member 12, comprising the steps of:

providing a housing 50 having a plurality of through holes 62 extending between a first surface 56 and a second surface 54, each of the through holes 62 defining a central axis;

positioning a plurality of elongated electrical contact members 20a-c in at least some of the through holes 62 oriented along the central axes, the electrical contact members having first ends 32 extending above the first surface 56;

positioning a flexible circuit member 14/14' to electrically couple the terminals (not shown) with the first ends 32 of the electrical contact member 20a-c; and

attaching the first ends 32 of the electrical contact members 20a-c to the terminals (see Col.5, lines 49-54 and 55-59) .

However, Grange et al. do not disclose **a compliant encapsulating member** elastically bonding the electrical contact members to the housing. Lightbody et al. discloses a compliant encapsulating member 32 to retain the electrical contact members 12 into the housing 11 and to insure a uniform an insertion depth of the pins 12 (see Col. 5, lines 30-33). **Therefore, it** would have been obvious to one having ordinary skill in the art at the time the invention was

Art Unit: 2833

made to include a compliant encapsulating member 32 of Lightbody et al. in structure of Grange et al. to retain the contact member in the housing and to insure a uniform an insertion depth of the pins **in order to provide more even and more reliable electrical connection.**

In regard to claim 138, Grange et al. modified by Lightbody et al. comprising the step of:

interposing a compliant encapsulating material 32 between a portion of the through holes and a portion of the electrical contact members to control movement of the electrical contact members along their respective central axes.

Claim 114 is rejected under 35 U.S.C. 103(a) as being unpatentable over Grange et al. (5388998) and Lightbody et al. (4528500) as applied to claim 112 above, and further in view of McMillan et al. (5829988).

Grange et al. when modified by Lightbody et al. disclose most of the claimed invention except for at least one of the terminals on the flexible circuit member comprises a singulated terminal. **McMillan et al. discloses singulated terminals 212 with a slot 210 around (see Fig.4B and Col. 8, lines 25-39) to create a spring action for better and stronger electrical contact with balls 36. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made and for the same reason to use singulated terminals of McMillan et al. in structure of Grange et al.**

Allowable Subject Matter

Art Unit: 2833

Claims 91-111 and 134-136 are allowed.

Claims 115 – 117, 125 and 139 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: The Prior Art does not teach or suggests:

In regard to claims 115 and 139, an electrical connector for electrically interconnecting terminals on a flexible circuit member with terminals on a second circuit member comprising a compliant material positioned along a surface of the flexible circuit member **opposite** the terminals of the flexible circuit member;

In regard to claim 125, the second ends of at least two of the electrical contact members formed so as to extend beyond the second surface of the housing by a different amount.

Response to Arguments

Applicant's arguments filed 01/08/04 with respect to claims 65-77 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Fan et al. (6312266), Martin (3904934), Brodsky et al. (6695623).

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

Art Unit: 2833

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Larisa Z Tsukerman whose telephone number is (571)-272-2015. The examiner can normally be reached on Monday through Friday from 8:30 am to 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paula A Bradley can be reached on (571)-272-2800 ex. 33. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)-308-0956.



THO D. TA
PRIMARY EXAMINER

LT, March 25, 2004